L Number	Hits	Search Text	DB	Time stamp
-	36	count$3 with (COM adj3 object$1)	USPAT; US-PGPUB	2004/04/14 19:01
-	31	(count$3 with (COM adj3 object$1)) and @ad<20000709	USPAT; US-PGPUB	2004/04/14 18:04
-	29	((count$3 with (COM adj3 object$1)) and @ad<20000709) and monitor$3	USPAT; US-PGPUB	2003/10/10 15:47
-	23	(((count$3 with (COM adj3 object$1)) and @ad<20000709) and monitor$3) and activit$3	USPAT; US-PGPUB	2003/10/14 13:48
-	47	addref$3 with (referenc$3 adj2 count$1)	USPAT; US-PGPUB	2004/04/14 18:04
-	7	((addref$3 with (referenc$3 adj2 count$1)) and @ad<20000709) and artificial$3	USPAT; US-PGPUB	2004/04/14 18:39
-	12	((addref$3 with (referenc$3 adj2 count$1)) and @ad<20000709) and monitor$3	USPAT; US-PGPUB	2004/04/14 18:08
-	36	(addref$3 with (referenc$3 adj2 count$1)) and @ad<20000709	USPAT; US-PGPUB	2004/04/14 18:39
-	73	refcount$3	USPAT; US-PGPUB	2004/04/14 18:40
-	0	(refcount$3 and @ad<20000709) and artificial$3	USPAT; US-PGPUB	2004/04/14 18:39
-	43	refcount$3 and @ad<20000709	USPAT; US-PGPUB	2004/04/14 18:40
-	40	(refcount$3 and @ad<20000709) and exist$3	USPAT; US-PGPUB	2004/04/14 18:41
-	3	((refcount$3 and @ad<20000709) and exist$3) and com	USPAT; US-PGPUB	2004/04/14 18:41

US-PAT-NO: 6412020

DOCUMENT-IDENTIFIER: US 6412020 B1

TITLE: Method and system for aggregating objects

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Application Filing Date - AD (1):
19980616

Brief Summary Text - BSTX (65):
Code Table 1 contains C++ pseudocode for a typical implementation of the method QueryInterface for class XX, which inherits the class IUnknown. If the spreadsheet object supports the IDatabase interface, then the method QueryInterface includes the appropriate case label within the switch statement. The variables pIBasic and pIDatabase point to a pointer to the virtual function tables of the IBasic and IDatabase interfaces, respectively. The method QueryInterface invokes to method **AddRef** (described below) to increment a **reference count** for the object of class XX when a pointer to an interface is returned.

Brief Summary Text - BSTX (66):
The interface IUnknown also defines the methods AddRef and Release, which are used to implement reference counting. Whenever a new reference to an interface is created, the method **AddRef** is invoked to increment a **reference count** of the object. Whenever a reference is no longer needed, the method Release is invoked to decrement the reference count of the object and, when the reference count goes to zero, to deallocate the object. Code Table 2 contains C++ pseudocode for a typical implementation of the methods AddRef and Release for class XX, which inherits the class IUnknown.

Detailed Description Text - DETX (7):
In a preferred embodiment, an aggregate object maintains a reference count. When the aggregate object is instantiated, its reference count is set to one. The method QueryInterface of the controlling IUnknown increments the reference count when a reference is returned to the client. The method **AddRef** of an exposed interface of an enclosed object invokes the method **AddRef** of the controlling IUnknown interface to increment the **reference count** of the aggregate object. Similarly, the method Release of an exposed interface of an enclosed object invokes the method Release of the controlling IUnknown interface to decrement the reference count of the aggregate object and delete the aggregate object when the reference count equals zero. When an enclosed object is instantiated, the reference count of the enclosed object is set to one. When the aggregate object is deleted, the method Release of the IUnknown interface of each enclosed object is invoked to delete the enclosed object.

Detailed Description Text - DETX (9):

The method QueryInterface of an exposed interface can return a pointer to each exposed interface and increments the reference count of the aggregate object when a pointer is returned. The method QueryInterface of the controlling IUnknown has direct access to the pointers to the interfaces--A, B, and controlling IUnknown--that implementation I3 implements and invokes the method QueryInterface of the IUnknown interface of the enclosed objects to retrieve pointers to the exposed interfaces--C and F--of enclosed objects S1 and S2. When a pointer to an exposed interface is returned, the method QueryInterface of the controlling IUnknown interface increments the **reference count** of the aggregate object S3 by invoking the method **AddRef** of the controlling IUnknown interface. The method QueryInterface of each exposed interface (other than the controlling IUnknown interface) preferably invokes the method QueryInterface of the controlling IUnknown interface.

Detailed Description Text - DETX (11):

As shown in Code Table 3, the method S1::QueryInterface returns a pointer to the interface C, the interface D, or the interface IUnknown. When a pointer to the interface C or interface D is returned, the method S1::QueryInterface invokes the method S1**::AddRef** to increment the **reference count** for the S1 object. The method S1**::AddRef** increments the **reference count,** and the method S1::Release decrements the **reference count** and deletes the S1 object when the **reference count** is zero. When a pointer to the interface C or interface D is returned, the method S1::QueryInterface invokes the method AddRef of the controlling IUnknown interface, which when the S1 object is not aggregated is the method S1::AddRef.

Detailed Description Text - DETX (21):

The methods S3::QueryInterface, S3::AddRef, and S3::Release compose the controlling IUnknown interface for the aggregate. The method S3::QueryInterface returns a pointer to the controlling IUnknown, A, B, C, or F interfaces. When a pointer to the controlling IUnknown interface is returned, the method S3::QueryInterface invokes the method S3**::AddRef** to increment the **reference count** for the S3 object. The method S3**::AddRef** increments the **reference count,** and the method S3::Release decrements the **reference count** and deletes the S3 object when the **reference count** is zero. When a pointer to the A, B, C, or F interfaces is returned, the method S3::QueryInterface invokes the method AddRef of the controlling IUnknown interface, which when the S3 object is not aggregated is the method S3::AddRef.

Detailed Description Text - DETX (24):

The method S3**::AddRef** increments the **reference count** of the S3 object. The method S3::Release decrements the reference count. When the reference counts is zero, the method S3::Release deletes the S3 object.